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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/675,991	09/29/2000	Randy B. Osborne	042390.P8456	1740

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Bradley J Bereznak
Blakely Sokoloff Taylor & Zafman LLP
7th Floor
12400 Wilshire Boulevard
Los Angeles, CA 90025-1026

EXAMINER
KING, JUSTIN

ART UNIT	PAPER NUMBER
2181	

DATE MAILED: 02/19/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 07-01)

	Application No.	Applicant(s)
Office Action Summary	09/675,991	OSBORNE, RANDY B.
	Examiner	Art Unit
	Justin I. King	2181

-- Th MAILING DATE of this communication app ars on the cover sh et with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _9/29/00_

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-23_ is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1-23_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

    If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

        1.☐ Certified copies of the priority documents have been received.

        2.☐ Certified copies of the priority documents have been received in Application No. _____ .

        3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

    a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _5_ .

4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: ___ .

DETAILED ACTION

Specification

1.   There is an extra "a" in the phrase of "a half duplex a bus" on page 2 line 17.

Claim Rejections - 35 USC § 112

2.   The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3.   Claim 15 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 15 recites the limitation "the arbiter of the first agent" in claim 15's line 1. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

4.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5.   The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

16-18, 21, and 22

6. Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's

admitted prior art and Thompson (U.S. Patent No. 5,392,404).

Referring to claim 1: The Applicant discloses that a typical I/O environment is known in

which a half duplex bus is deployed to connect a memory controller and an I/O bridge

(application page 2, paragraph 3); and Applicant also discloses the read request as to contend for

the bus ownership. But the typical half duplex bus I/O environment does not have the preempt

signal.

Thompson teaches that it is known that if a system bus control request is not granted

within a specific time period, data underruns and overruns may occur, thus data may be lost if a

bus control request by one I/O device is ignored while another I/O device maintains control of

the bus (column 1, lines 51-60). Thompson discloses asserting a preempt signal by one agent to

indicate that agent has requests pending for transmission over the bus, and sampling the preempt

signal by the other agent; and relinquishing ownership of the bus by the other agent responsive to

the preempt signal (abstract, column 1, lines 50-60, column 2, lines 40-51).

Therefore, it would have been obvious to one having ordinary skill in the computer art to

combine Thompson's teaching with the typical I/O environment because Thompson teaches one

to prevent the underruns or overruns.

Referring to claim 2: Claim 2 is rejected over the admitted prior art and Thompson as

stated the claim 1's argument above; furthermore, it is the preempt signal's purpose to allow the

first agent to gain the bus and transmit the request once the second agent relinquishes the bus.

Referring to claim 3: Claim 3 is rejected over the admitted prior art and Thompson as

stated the claim 1's argument above; furthermore, the admitted prior art discloses the read

returns (page 2, line 23), which is the means for sending read data. Neither the admitted prior art

nor Thompson explicitly discloses the means for returning ownership. Although neither

references explicitly discloses the return means, the bus is only contended by two agents (the

memory controller and the I/O bridge), such that the bus ownership is alternated between two

agents. Hence, the combination of the admitted prior art and Thompson includes the returning

means.

Referring to claim 4: Claim 4 is rejected over the admitted prior art and Thompson as

stated the claims 1 and 3's arguments above; furthermore, the admitted prior art discloses the

read data is associated with the read request (specification page 5, last paragraph, page 6,

paragraph 1).

Referring to claim 5: Claim 5 is rejected over the admitted prior art and Thompson as

stated the claim 1's argument above; furthermore, the admitted prior art discloses a memory

controller (specification, page 5, line 20).

Referring to claim 6: Claim 6 is rejected over the admitted prior art and Thompson as

stated the claim 1's argument above; furthermore, the admitted prior art discloses an input/output

device (specification, page 5, line 20).

Referring to claim 16: The Applicant discloses that a typical I/O environment is known,

which includes a half-duplex bus, first and second agents coupled to the half-duplex bus, each

having an arbiter that follows an algorithm to determine ownership of the half-duplex bus, and

first and second request lines coupled between the first and second agents, the first request line

being asserted by the first agent to request ownership of the half-duplex bus from the second

agent, and the second request line being asserted by the second agent to request ownership of the

half-duplex bus from the first agent in accordance with the algorithm (specification, page 2,

paragraph 2). But the typical half duplex bus I/O environment does not have the preempt signal.

Thompson teaches that it is known that if a system bus control request is not granted

within a specific time period, data underruns and overruns may occur, thus data may be lost if a

bus control request by one I/O device is ignored while another I/O device maintains control of

the bus (column 1, lines 51-60). Thompson discloses asserting a preempt signal by one agent to

indicate that agent has requests pending for transmission over the bus, and sampling the preempt

signal by the other agent; and relinquishing ownership of the bus by the other agent responsive to

the preempt signal (abstract, column 1, lines 50-60, column 2, lines 40-51).

Therefore, it would have been obvious to one having ordinary skill in the computer art to

combine Thompson's teaching with the typical I/O environment because Thompson teaches one

to prevent the underruns or overruns.

Referring to claim 17: Claim 17 is rejected over the combination of the admitted prior art

and Leger as stated in the claim 16's argument; furthermore, the admitted prior art discloses the

read request (specification, page 2, line 23).

Referring to claim 18: Claim 18 is rejected over the combination of the admitted prior art

and Leger as stated in the claim 16's argument; furthermore, the admitted prior art discloses the

read return (specification, page 2, line 23). Thompson discloses the preempt signal provides the

means by which the I/O device in control of the system bus relinquishes control of the system

bus to an alternate I/O device in response to the bus access request by the alternate I/O device

(column 2, lines 47-51); such that Thompson discloses asserting the preempt signal during a bus transaction between two agents.

Referring to claim 21: Claim 5 is rejected over the admitted prior art and Thompson as stated the claim 16's argument above; furthermore, the admitted prior art discloses a memory controller (specification, page 5, line 20).

Referring to claim 22: Claim 22 is rejected over the admitted prior art and Thompson as stated the claims 16 and 21's arguments above; furthermore, the admitted prior art discloses an input/output device (specification, page 5, line 20).

7.   Claims 7 and 9-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admitted prior art and Leger et al. (U.S. Patent No. 5,771,356).

Referring to claim 7: : The Applicant discloses that a typical I/O environment is known in which a half duplex bus is deployed to connect a memory controller and an I/O bridge (specification, page 2, paragraph 3); and Applicant also discloses the write transfer, read request, and read return as to contend for the bus ownership, and the associated request signal line used to gain bus ownership (specification, page 2, lines 9-10). Such that the admitted prior art discloses the sending a read return over the half-duplex bus from a first agent to a second agent, the sending the read request from the second agent to the first agent over the half-duplex bus, and the signaling the first agent by the second agent that the second agent has a read request pending. But the admitted prior art does not disclose the electing by the first agent a suitable point at which to preempt the read return.

Leger teaches that it is known to use a first-in-firs-out (FIFO) storage as a buffer for

pending bus requests as to accommodate the bus traffic (column 1, lines 22-24). Leger further

teaches that it is known to incorporate a threshold and to decide to transfer data across the bus

when the amount of data in the FIFO crosses the threshold value (column 1, lines 55-58).

Therefore, Leger discloses the electing means by the first agent a suitable point at which to

preempt the for the first agent.

Since the bus is only contended by two agents (the memory controller and the I/O

bridge), such that the bus ownership is alternated between two agents. Hence, the combination

of the admitted prior art and Thompson includes the returning means.

Hence, it would have been obvious to one having ordinary skill in the computer art to

combine the admitted prior art and Leger because Leger teaches one to prevent the FIFO

underruns or overruns.

Referring to claim 9: Claim 10 is rejected over the combination of the admitted prior art

and Leger as stated in the claim 7's argument; furthermore, the starvation is the underrun.

Referring to claim 10: Claim 10 is rejected over the combination of the admitted prior art

and Leger as stated in the claim 7's argument; furthermore, Leger's FIFO threshold is equivalent

to the cache line boundary.

Referring to claim 11: Claim 11 is rejected over the combination of the admitted prior art

and Leger as stated in the claim 7's argument; furthermore, neither the admitted prior art nor

Leger explicitly discloses one clock period turnaround for granting and returning ownership,

such limitation is merely a matter of design choice. This limitation does not define a patentably

distinct invention since both the claimed invention as a whole and the combined prior arts are

directed to enhance the bus transmission. The degree in which the length of the turnaround time is inconsequential for the invention as a whole and presents no new or unexpected result, so long as the suitable point is elected and current bus activity is preempted.

Referring to claim 12: Claim 12 is rejected over the admitted prior art and Thompson as stated the claim 7's argument above; furthermore, the admitted prior art discloses a memory controller (specification, page 5, line 20).

Referring to claim 13: Claim 13 is rejected over the admitted prior art and Thompson as stated the claim 7's argument above; furthermore, the admitted prior art discloses an input/output device (specification, page 5, line 20).

Referring to claim 14: Claim 14 is rejected over the admitted prior art and Thompson as stated the claim 7's argument above; furthermore, the admitted prior art discloses that each agent has a means to execute the arbitration algorithm (specification, page 2,line 12). The operation of the means to execute the arbitration algorithm is equivalent to the arbiter.

Referring to claim 15: Claim 15 is rejected over the admitted prior art and Thompson as stated the claim 7's argument above; furthermore, Leger discloses a means for monitoring the bus state, a means for monitoring the FIFO buffer state, a means for acquiring the bus ownership based on bus status and FIFO buffer status (column 2, lines 30-38); the operations of Leger's means are equivalent to the preemption algorithm to elect the suitable point.

8.　　　Claims 8, 19-20, and 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admitted prior art, Leger, and Thompson.

Referring to claim 8: Claim 7's argument applies; furthermore, the admitted prior art

discloses the asserting a request signal by the second agent and the sampling the request signal

by the first agent (specification page 2, paragraph 2). Neither the admitted prior art nor Leger

explicitly disclose the preempt signals from one of the agent.

Thompson teaches that it is known that if a system bus control request is not granted

within a specific time period, data underruns and overruns may occur, thus data may be lost if a

bus control request by one I/O device is ignored while another I/O device maintains control of

the bus (column 1, lines 51-60). Thompson discloses asserting a preempt signal by one agent to

indicate that agent has requests pending for transmission over the bus, and sampling the preempt

signal by the other agent; and relinquishing ownership of the bus by the other agent responsive to

the preempt signal (abstract, column 1, lines 50-60, column 2, lines 40-51).

Hence, it would have been obvious to one having ordinary skill in the computer art to

combine the admitted prior art, Leger, and Thompson because Leger and Thompson teach one to

prevent the FIFO underruns or overruns.

Referring to claim 19: Claims 16-18's arguments apply; furthermore, Leger teaches that

it is known to use a first-in-firs-out (FIFO) storage as a buffer for pending bus requests as to

accommodate the bus traffic (column 1, lines 22-24). Leger further teaches that it is known to

incorporate a threshold and to decide to transfer data across the bus when the amount of data in

the FIFO crosses the threshold value (column 1, lines 55-58). Leger discloses a means for

monitoring the bus state, a means for monitoring the FIFO buffer state, a means for acquiring the

bus ownership based on bus status and FIFO buffer status (column 2, lines 30-38); the operations

of Leger's means are equivalent to the preemption algorithm that determines a suitable point to relinquish ownership of the bus.

Referring to claim 20: Claims 16-19's arguments apply; furthermore, Leger's FIFO threshold is equivalent to the cache line boundary.

Referring to claim 23: Claims 16-19's arguments apply; Leger discloses a predetermined amount of data as the predetermined threshold (column 2, lines 45). Leger further discloses the threshold crossing detecting and adjusting mechanism with predetermined limits (column 10, line 48-53, figure 8).
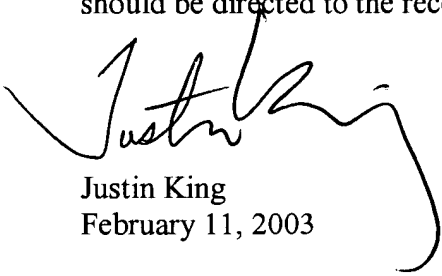
Conclusion

9.   Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Justin I. King whose telephone number is 703-305-4571. The

examiner can normally be reached on Monday through Friday, 9:00 am to 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Mark Rinehart can be reached on 703-308-3110. The fax phone numbers for the

organization where this application or proceeding is assigned are 703-746-7239 for regular

communications and 703-746-7239 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding

should be directed to the receptionist whose telephone number is 703-306-5631.

Justin King
February 11, 2003

GOPAL C. RAY
PRIMARY EXAMINER
GROUP 2100